JFK's Assassination

Conspiracy, Forensic Science, and Common Sense

Robert R. Artwohl, MD

THE JOURNAL interviews with Humes and Boswell,[1] the Dallas physicians,[2] and Finck[3] cleared up many of the events surrounding the attempted resuscitation and subsequent autopsy of President Kennedy. However, correspondence to THE JOURNAL indicates many physicians are still sympathetic to a key proconspiracy tenet regarding the Kennedy assassination: that the autopsy physicians conspired with the military, the Central Intelligence Agency (CIA), the Federal Bureau of Investigation (FBI), the Secret Service, and other agencies of government to disguise and suppress medical evidence that would show President Kennedy was publicly executed in Dealey Plaza on November 22, 1963, by multiple gunmen.

Unfortunately, many of the arguments raised in the letters supporting such a complex conspiracy went unanswered. These arguments should be addressed in *JAMA* for several reasons.

See also pp 1507, 1544 and 1552.

First, for many physicians, the only contact they will have with arguments for and against conspiracy will be through THE JOURNAL. Second, judging from the letters, it is apparent that many physicians need education in the pertinent forensic and ballistic sciences that pertain to the assassination. Finally, *JAMA* should not perpetuate speculation based on medical misinformation or misunderstanding by physicians. Already, many conspirati are using *JAMA*'s nonresponse to some of the letters as an endorsement of their claims.

Micozzi has responded to the question of the single-bullet theory, and readers are directed to his letter[4] and to the studies by Lattimer et al[5,6] for sources of further information. My discussion will focus on the letters to *JAMA* by Aguilar,[7] Smith,[8] Mantik,[9] and White,[10] which addressed the following issues: the putative alteration and forgery of the autopsy roentgenograms and photographs; the explosive head burst and backward movement of the President; the posterior ejection of blood and brain tissue; the differences in appearances of the wounds in Dallas and in Bethesda; and the small anterior neck wound. These issues are some of the least understood of the assassination and the most frequently raised by the conspirati to advance their theories.

THE AUTOPSY ROENTGENOGRAMS AND PHOTOGRAPHS: FORGERY OR MISINTERPRETATION?

Aguilar, a medical panel member at the recent (proconspiracy) (Assassination Symposium on John F. Kennedy in Dallas) points out that the 6.5-mm fragment, so prominent on the published anteroposterior skull roentgenogram, was not mentioned in the original autopsy report or in subsequent testimony given by the autopsy physicians. He states that these physicians would not have failed to mention such an obvious radiographic finding if it was there. Thus, he implies, the published roentgenograms that show this fragment must be forgeries.

Aguilar's attempt to use a negative to prove a positive is pure conjecture and, in fact, proves nothing. There are several large fragments of metal evident on the roentgenograms, none of which was specifically mentioned in the report. One large 7×2-mm fragment, not commented on in description of the roentgenograms, was removed from the brain and given to the FBI. Besides, at the time the roentgenograms were taken, the autopsy physicians considered it likely that the bullet had not exited the body, because an exit site of the posterior neck wound had not been identified. Their immediate concern was finding a bullet they thought was still in the body, not identifying and locating each bullet fragment.[1] Furthermore, Aguilar[7] does not indicate what advantage the conspirators would have gained by adding the fragment to the "forged" roentgenogram. There was already a bullet hole with intracranial bullet fragments coning out from it, soft-tissue swelling in the area of the wound, and small, inwardly depressed bone fragments from the inner table of the skull where the bullet entered. Surely that would have been enough to indicate an entrance wound at that level.

Aguilar[7] and Mantik[9] correctly point out that the Bethesda autopsy team described the rear head wound to be to the right and slightly above the external occipital protuberance (EOP), while subsequent forensic experts, using the autopsy photographs and roentgenograms, located the wound 10 cm above the EOP. Aguilar has discounted the possibility that three pathologists could have been wrong about the location of the wound and, instead, implies this is further evidence the roentgenograms and photos were forged or altered.

However, there are two reasons why it is unlikely that the bullet entered near the level just above the EOP. First, given the position of the President's head in frame 312 of the Zapruder film (the moment just before the head burst), for a bullet to enter just above the EOP and exit the right frontotemporoparietal area, it would have had to travel in an upward direction, fired from inside the limousine's trunk. Not even the most radical or imaginative of the conspirati has supposed a sniper to have been in this location.

Furthermore, Boswell's testimony and autopsy drawing refutes such a low en-

From the Department of Emergency Medicine, Union Memorial Hospital, Baltimore, Md.

This work is the sole result of the author's own personal pursuits, readings, and opinions on the subject discussed herein. It has not been sponsored, financed, or funded in whole or in part by any organization or person, including the Union Memorial Hospital or the Department of Emergency Medicine at the Union Memorial Hospital, Baltimore, Md.

Reprint requests to Department of Emergency Medicine, Union Memorial Hospital, 201 E University Pkwy, Baltimore, MD 21218 (Dr Artwohl).

try point. In discussing the entrance wound with the House Select Committee on Assassinations' pathologists, Boswell stated the entry wound at first appeared to be only a semicircle bordering on the posterior edge of the large skull defect and the true nature of the wound was later completed when a recovered bone fragment was brought to the autopsy room.[11(p259)] If the autopsy report correctly describes the location of the entry wound, the posterior edge of the large skull defect would have reached just above the EOP. However, in his autopsy drawing, Boswell depicted two fractured but attached segments of bone 10 cm long that extended posteriorly, beyond the edge of the large defect. There would not be enough bone left to have 10-cm-long segments extending down from the posterior edge of the large skull defect if it ended near the level of the EOP. This discrepancy later confused Boswell in his discussions with the House Select Committee on Assassinations' pathologists.[11(p253)] A review of the lateral roentgenogram, which was taken before the completing fragment was brought into the autopsy room, confirms the accuracy of Boswell's drawing. Beyond the posterior edge of the wound, the fractured 10-cm-long posterior segments sketched by Boswell can be seen, and they extend down the back of the skull to the level of the EOP. Thus, Boswell's account of the morphology of the wound, his sketch of the skull done at the autopsy, and the roentgenograms are all consistent with an entry wound 10 cm above the EOP at the posterior edge of the large skull defect.

Aguilar[7] and Smith[8] relate claims made by the autopsy roentgenogram technician that the published roentgenograms are fake. Before we rush to judgment, we should ask ourselves: How reliable are the technician's statements?

At least one major claim the technician has made regarding the fraudulence of the roentgenograms is wrong. In a televised interview conducted by Sylvia Chase on KRON in San Francisco (November 18, 1988), the technician, holding up the lateral skull view, pointed to a large triangular skull fragment at the superior aspect of the skull and stated that this fragment should not be there since that area of the skull was missing. Thus, he declared, the roentgenograms are fake. However, the technician actually pointed to a fragment of the extensively fractured left parietal bone. In fact, the roentgenograms do show bone to be missing on the right side of the skull in the parietal area indicated by the technician, just as he claimed. Is the roentgenogram fake, or was it misinterpreted by the technician who took it?

The technician is one of many responsible for the claim that the anteroposterior view shows the right upper third of the face is missing, while the autopsy photographs show the face is intact. Unfortunately, this claim was reinforced on the television program *Inside Edition* by Robert McClelland, MD, one of the Parkland Hospital surgeons who participated in the attempt to resuscitate President Kennedy, when he stated that some skull roentgenograms "show what appears to be the entire right side of the skull gone, with a portion of the orbit—that's the skull around the eye—missing too."[12] According to the conspirati, this mismatch is yet another indication that the roentgenograms and photographs are fakes. However, this interpretation is also wrong. The "anteroposterior" skull film taken during the autopsy is not a true anterior-posterior projection, but a modified Waters' view in which the roentgen beams project upward through the face, through the frontoparietal area of the skull, and then onto the x-ray film. Since the bone of the right frontoparietal area of the skull is missing, much more irradiation has reached the area of the film depicting the right upper third of the face, causing this area to be overpenetrated. Using a spotlight (or enhancing it by computer), one can "bring out" the right frontal sinus, the fractured (but entirely present) right orbit, the right nasal bones, and the frontal bone. The swollen and ecchymotic right orbit seen in the autopsy pictures and Humes' description of the instability of the face in this area correspond precisely to the extensive right orbital fracture and frontal bone fractures seen on the available roentgenograms.

In considering their allegations of fraudulent roentgenograms, both Aguilar and Smith would do well to ask themselves the following two questions: (1) What sort of technology existed in the 1960s to produce or alter a photographic negative (which is what a roentgenogram is) so exact, so precise, and so consistent in its subtle anatomic, radiographic, photographic, and pathological details that it could fool every forensic pathologist, anthropologist, and dentist who studied them? (Answer: none.) (2) There were two lateral roentgenograms, each depicting the same thing from slightly different angles, so why produce two fake roentgenograms?

THE HEAD BURST AND BACKWARD MOVEMENT OF THE PRESIDENT

Mantik[9] embraces the three most common assumptions made regarding the head wound: (1) that frame 313 of the Zapruder film, which depicts the head burst, is the moment of bullet impact; (2) that the backward head and body movement is a reaction to the bullet impact; and (3) that a left posterior ejection of blood and brain tissue indicates the bullet entered from the front. Each of these assumptions is wrong.

An explosive head injury like the one suffered by President Kennedy results from the transfer of a bullet's kinetic energy to a temporary pressure cavity, which is produced as the bullet decelerates in its transit through the cranium. The cavity forms behind the bullet, and the pressure generated can be enormous: 700 to 1400 pounds per square inch.[13] Since the skull is a closed, bony compartment that cannot expand, the pressure can only be relieved by a sudden burst. The sequence of events is this: bullet impact; penetration; deceleration and pressure cavity formation; tumbling and fragmentation of the bullet; exit of fragments; further expansion of the pressure cavity; and, finally, head burst. The autopsy roentgenograms show the extensive bilateral fracturing of the skull typically produced by such a burst.

Each Zapruder frame advances every 1/18 second, and the exposure time of each frame (the time the shutter is actually open) is 1/30 second. In 313, one can see a bone fragment that has ejected from the parietal region of the skull and has already reached a height of 6 to 8 feet in the air. Thus, by the time the shutter has closed in 313, the bullet has not only impacted the head, but has traveled through and exited the head. However, the head has not yet moved backward, nor does it start to move back until 315. Clearly, the impact of the bullet had nothing to do with the subsequent backward head movement.

The complex backward movement of the President, probably due to several interacting causes, is beyond the scope of this discussion. Alvarez[14] and Lattimer et al[15] provide further analysis. A reflexive pushing off of the president by Mrs Kennedy should also be considered as a contributing factor.

THE POSTERIOR EJECTION OF BLOOD AND BRAIN TISSUE AND THE 'OCCIPITAL' WOUNDS: A SHOT FROM THE FRONT?

Mantik[9] cites the reports of officers Hargis and Martin, the two motorcycle police riding to the left rear of the limousine who were splattered by blood and brain tissue. This so-called left posterior ejection is often cited as strong correlative evidence that the shot that hit President Kennedy in the head originated from his right front.

However, the cloud of blood and brain visible in 313 did not exit in any given

plane, but exited as an expanding sphere spreading out in all directions. If one takes a pair of calipers to the entire circle of blood in 313, one finds it radiates from a point fairly well centered in the right frontotemporoparietal opening. The initial opening of the large skull defect occurred at the right frontotemporoparietal area because this is the weakest area of the skull and/or it was further weakened by exiting bullet fragments. As the hole enlarged and involved the superior right parietal area, tissue fanned out in all directions. However, it is not the exiting bullet fragments, but the symmetrically enlarging pressure cavity that was responsible for the head burst and the dramatic ejection of material.

Furthermore, Mantik failed to mention the Warren Commission testimony of Governor Connally, who was seated in front of President Kennedy and who was also splattered by blood and brain. After the head shot, his clothes and the interior of the limousine around him were covered with brain tissue. He recalled a brain fragment as large as his thumb on his pants leg. Mantik also failed to mention the testimony of Mrs Connally who was also in front of the President, and who stated that after the head shot, she felt as though she was hit by "spent buckshot," but then quickly realized it was "brain tissue" and "human matter" that had sprayed "all over the car."[16(p147)] The sum testimony of officers Hargis and Martin and Governor Connally and his wife confirms the most logical scenario of events: after the head burst, blood was pushed out from the head as an expanding sphere and hit several people within a certain radius.

One recently published proconspiracy book shows several black-and-white autopsy photographs indirectly obtained from a Secret Service agent who had allegedly received them from his superior in December 1963.[17] One of these photographs depicts the cranial cavity after reflection of the scalp and removal of the brain. The book's author purports this photograph shows a defect at the rear of the skull that contains part of an outwardly beveled exit wound, thus indicating a shot from the front. Judging from White's letter,[18] it is apparent he does not realize the photograph has been published upside down. If he inverts the book, he will be able to correctly interpret the photograph. Shot from above and in front, the photograph actually depicts part of the large right frontotemporoparietal defect. Along one of the edges of the skull defect is a semicircular notch with beveling to the outer surface that was considered by the House Select Committee on Assassinations pathologists to represent a frontal exit wound. If White would review the House Select Committee on Assassinations pathologists' discussion with Humes and Boswell of this photograph and others similar to it,[11(pp244-245)] he will better understand what the photo represents.

The sketch of the wound as drawn by the Dallas physicians, which depicts a low, right posterior wound, is also cited as evidence that a shot fired from the front blew out the back of the President's head. The theory that there was a wound in this location has several problems: (1) The wound, as the Dallas physicians portrayed it, is not visible on the Zapruder or Nix films. (2) For this wound to have been created from a shot fired from anywhere behind the picket fence, the bullet would have had to enter the right front of the head at a sharp angle, then veer sharply to the President's right when inside the cranium to exit from the right occipital aren. (3) This wound would have caused much of the right lambdoidal suture to be missing. This suture is complete in the autopsy roentgenograms, and forensic anthropologists have verified its authenticity by comparison with skull films taken of President Kennedy during life. (4) I have not been able to find one Dealey Plaza eyewitness account describing a low right occipital wound. For instance, Special Agent Glen Bennett, who was in the Secret Service car behind President Kennedy, described it as a shot that "hit the right rear *high* of the President's head [emphasis added].[15]" Bill Newman, who was standing just to the right of President Kennedy, stated, "By the time he was directly in front of me... he was hit in the *side* of the head [emphasis added]."[19] Both of these statements are compatible with the wound as seen on the Zapruder film and the roentgenograms. Not one of these witnesses described a wound in the low right posterior portion of the skull. The Dealey Plaza witnesses were probably reliable witnesses of the wound. Just after the head explosion, the wound was fresh, had not yet bled profusely, and had not been altered by Mrs Kennedy, who had tried to put her husband's head back together on the way to Parkland Hospital.

THE APPEARANCE OF THE WOUNDS IN DALLAS AND IN BETHESDA

Mantik also discusses the discrepancy in the size, location, and appearance of the head wound between the Dallas and Bethesda examinations.[9] This is hardly surprising. In Dallas, the physicians were trying desperately to save the President's life and were confronted with an actively bleeding wound comprising blood, brain, bone fragments, scalp flaps, and clot. Furthermore, the head wound gushed blood with each chest compression. Most likely, the large frontoparietotemporal bone flap, so evident on the Zapruder film, was closed over and was held in place by clot. Other adherent skin flaps, bone fragments, tissue, and coagulated blood no doubt concealed the true nature of the wound from the Dallas physicians who, as James Carrico testified, inspected President Kennedy's wounds quickly "without taking the time... to wash off the blood and debris" and left immediately after the President was pronounced dead.[20(p31)]

By the time the body had reached Bethesda, postmortem clot lysis had occurred. As the congealed blood liquefied en route from Dallas, it probably was absorbed by the towels and sheets surrounding the head, rendering the true nature and extent of the wound more apparent.

THE SMALL ANTERIOR NECK WOUND: ENTRANCE OR EXIT?

Mantik brings up President Kennedy's anterior neck wound and infers that a wound of 5 mm could not be an exit wound.[9] This is simply not the case. There are three reasons why the morphology of this wound is easily compatible with an exit wound. First, a heavy-metal-jacket, high-velocity bullet that loses very little velocity and does not deform or tumble as it passes through the body will often produce a small exit wound. Second, the skin of the neck may have been shored by President Kennedy's shirt collar. Finally, loose skin, like that of the neck, is a typical site of small exit wounds. Interestingly enough, another error in judging entrance vs exit based on size was made in Dallas. Robert Shaw, MD, the thoracic surgeon who operated on Governor Connally's chest wounds, inspected the through-and-through wound of the Governor's right wrist. He judged the small 5-mm wound on the volar surface to be the entrance and the large 3-cm wound on the dorsum to be the exit.[20(p49)] However, closer inspection of the wound at operation by Charles Gregory, MD, revealed that the large wound was the entrance and the small wound was the exit.[16(pp118-119)] The significant aspect of this finding cannot be overemphasized: the size of the documented wrist exit wound is the same size as Kennedy's anterior neck wound. Thus, based on size alone, the anterior neck wound is compatible with an exit. No other feature of the bullet wound was noted by the Dallas physicians. In making his tracheostomy through the bullet hole, Dr Malcolm Perry acknowledges he "didn't even wipe off the blood before... [he] made a quick and large incision...."[12]

FORENSIC SCIENCE AND COMMON SENSE

Proper forensic analysis of a homicide requires tremendous knowledge and experience. Yet even the experts at the Wound Ballistics Branch of the US Army Chemical Research and Development Laboratories at Edgewood Arsenal, Md, were surprised by the results of their investigations for the Warren Commission.

In conducting experiments designed to simulate President Kennedy's wounds, Alfred Olivier, DVM, and his group used Lee Harvey Oswald's gun and fired the same type of bullet allegedly used by Oswald, a Western Cartridge Company 6.5-mm bullet.[21] To simulate the neck wound, they fired through 14-cm-thick gelatin blocks or animal muscle. The bullets traversed the models intact and created small entrance and exit wounds. They lost very little velocity, maintaining the velocity required for a bullet to pass through President Kennedy's neck and go on to wound Governor Connally.

Based on these experiments, Olivier initially questioned whether the bullet could cause the type of explosive head wound inflicted on President Kennedy. He assumed that in the head, just as in the neck, the bullet would remain stable and cause small entrance and exit wounds. To investigate the head wound, his group fired at gelatin-filled skulls from a distance of 270 feet, approximately the distance from the Texas School Book Depository to President Kennedy's head at the time of the fatal shot. Much to Olivier's surprise, the bullet fragmented inside the skull and caused an explosive exit wound. (Lattimer et al[15] confirmed that the Western Cartridge Company, 6.5-mm bullet was capable of creating such an explosive exit.) Olivier, a scientist, used his findings to enhance his realm of expertise and he formed a reasonable conclusion: Oswald's rifle and ammunition were capable of inflicting both of President Kennedy's wounds.

One must also remember that what might seem unusual or even impossible to the inexperienced may be quite common to the expert. The relatively small amount of deformation of the so-called pristine bullet is a rallying cry for the conspirati. However, forensic pathologists with extensive gunshot wound experience do not find this unusual. Indeed, one well-known authority has told me that he has not only recovered full-metal-jacket bullets that have caused more bone and tissue destruction suffering less deformity than seen in the Parkland stretcher bullet, but has recovered completely nondeformed, unjacketed .22-caliber lead bullets that have embedded into vertebral bodies (V. G. M. DiMaio, MD, oral communication, December 14, 1992).

The autopsy findings and all photographic and available assassination films support the fact that there were two shots from the rear. Although the preponderance of nonmedical evidence indicates that Lee Harvey Oswald acted alone as a maladjusted individual, killing President Kennedy with a Mannlicher-Carcano rifle, it cannot totally disprove his acting with (or being duped by) a small private group of conspirators in a plot to assassinate President Kennedy.

However, there are large problems of logic and common sense with the government-led or government-involved conspiracy theories. If the Secret Service, the FBI, the CIA, and other agencies with close access to the President wanted to dispose of him, they could have availed themselves to a number of covert means of dispatch. It is difficult to believe a government-led team of President's assassins came up with the following complex plan. First, take several years setting up Lee Harvey Oswald. Then, get him a job in the Texas School Book Depository so he could be in position kill the President and meticulously plant evidence with which to frame him. For the central piece of evidence, obtain a cheap mail-order rifle with an inexpensive sight. (Apparently no one thought to spend a few more dollars and get a more credible rifle.) Arrange to have the President fired upon from several different directions using at least three teams of marksmen. (Why would it take several teams of marksmen, not one, not two, but, by conspirati count, three to six volleys of gunfire to hit a slow-moving target at close range with the fatal head shot?) After the President is hit with multiple bullets from multiple directions, the military and numerous government agencies, beginning right at Parkland Hospital, move quickly to conceal multiple bullet holes from civilian physicians (or coerce them all into silence), whisk away bullets, alter the President's body, forge roentgenograms and photographs, and alter every home movie and photograph of the assassination to conceal the true nature of the injuries and the number of accomplices involved.

The most astonishing feature of this plan is that the plotters would have to have been confident in advance they would he able to recover every bullet, find every witness, control the movements of hundreds of witnesses, and destroy every photograph and home movie that had incriminating evidence and leave behind those that did not.

In the illogical world of the Kennedy assassination conspiracy and its associated booming entertainment industry, any fact or finding that contradicts the popular Rube Goldberg scenario is dismissed as disinformation. Any contrary document or photograph is judged to be a government forgery. Any person or group who questions the conspirati's erroneous or unsubstantiated claims is denounced as coconspirator or dupe. This has been the fate of Humes, Boswell, and Finck. This has become the fate of the members of the Warren Commission. This is becoming the fate of Malcolm Perry, Jim Carrico, Charles Baxter, and M. T. Jenkins. Many members of the conspiracy crowd now claim that these highly successful physicians expressed confidence in the key findings of the autopsy out of fear of retribution from as yet unidentified nefarious minions still at work in the government. Even *JAMA*, its editor, and the American Medical Association have been added to the proconspiracy list of accessories after the fact. As the years pass, one thing becomes abundantly clear: for the conspirati, it is conspiracy above all else, including forensic science, and common sense.

References

1. Breo DL. JFK's death—the plain truth from the MDs who did the autopsy. *JAMA*. 1992;267:2794-2803.
2. Breo DL. JFK's death, part II—Dallas MDs recall their memories. *JAMA*. 1992;267:2804-2807.
3. Breo DL. JFK's death, part III—Dr Finck speaks out: 'two bullets, from the rear.' *JAMA*. 1992;268: 1748-1754.
4. Micozzi MS. The injuries to JFK. *JAMA*. 1992; 268:1684.
5. Lattimer JK, Lattimer J. The Kennedy-Connally single bullet theory: a feasibility study. *Int Surg*. 1968;50:524-532.
6. Lattimer JK, Lattimer G, Lattimer J. Could Oswald have shot President Kennedy? further ballistic studies. *Bull N Y Acad Med*. 1972;48:513-524.
7. Aguilar GL. The injuries to JFK. *JAMA*. 1992; 268:1681-1682.
8. Smith WS. The injuries to JFK. *JAMA*. 1992; 268:1684.
9. Mantik DW. The injuries to JFK. *JAMA*. 1992; 268:1684.
10. White A. The injuries to JFK. *JAMA*. 1992; 268:1683.
11. House Select Committee on Assassinations. Washington DC: US Government Printing Office; 1979:vol 7.
12. Summers A. *Conspiracy*. New York, NY: Paragon House; 1989:485.
13. DiMaio VGM. *Gunshot Wounds: Practical Aspects of Firearms, Ballistics, and Forensic Techniques*. New York, NY: Elsevier Science Publishing Co Inc; 1985:42.
14. Alvarez LW. A physicist examines the Kennedy assassination film. *Am J Physics*. 1976;44:813-827.
15. Lattimer JK, Lattimer J, Lattimer G. An experimental study of the backward movement of President Kennedy's head. *Surg Gynecol Obstet*. 1976; 142:246-254.
16. Warren Commission Hearings. Washington DC: US Government Printing Office; 1964:vol 4.
17. Livingstone HE. *High Treason II*. New York, NY: Carroll & Graf Publishers Inc; 1992:432.
18. Warren Commission Hearings. Washington DC: US Government Printing Office; 1964;18:89.
19. Marrs J. *Crossfire: The Plot That Killed Kennedy*. New York, NY: Carrol and Graf; 1990:39.
20. Warren Commission Hearings. Washington DC: US Government Printing Office; 1964:vol 6.
21. Warren Commission Hearings. Washington DC: US Government Printing Office; 1964;5:75-89.